

Assessment of Perceived Service Quality of Launch Services in Dhaka-Barishal Route

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Abstract

Inland water transport especially launch transport is a high-demand mode of public transportation in Bangladesh due to its numerous rivers. Before the Padma Bridge, water routes were the only option, causing a decline in the quality of inland launch services. Despite its importance, there is limited research on the perceived service quality of this transport system in Bangladesh. This study aims to examine service quality of inland water transport on the Dhaka-Barishal route to fill the research gap. Count data model is used to analyze the data collected from 260 randomly selected passengers through a questionnaire survey. The independent variables are formed from the socio-economic and demographic characteristics, travel characteristics and travel experiences of the respondents. Perceived service quality developed from the questionnaire related to comfort, punctuality, cleanliness, safety, staff characteristics and harassment is the dependent variable. The role of gender, age and income etc. in affecting perceived service quality was found to be significant. It is found that improvements in scheduling, comfort, and safety are essential for ensuring passenger satisfaction. This can guide policymakers in enhancing service quality by identifying key factors and taking necessary steps to meet passenger needs.

Keywords: Service Quality; Count Data Model; Launch Service; Public Transportation.

1 Introduction

Inland water transport (IWT) plays a vital role in the transportation system of Bangladesh, a riverine country. Compared to other choices, its affordability and accessibility increase the demand for transporting people and products nationwide. Water transportation is commonly used for intra-district and inter-district travels throughout the southern districts of Barisal, Jhalokathi, Bhola, Borguna, Patuakhali, and Pirozpur, as well as with Dhaka. Until the completion of the Padma bridge, the Dhaka-Barishal river route was the busiest due to a lack of economical transportation choices linking these two regions. The country's inland waterway network generates around 1.5 million passengers every route kilometer of waterway per year (Ashraf et al., 2021). At least 10,000 people travel via the Dhaka-Barishal route daily ("Barishal-bound passengers to prefer launch," 2022). Besides the economic reason, safety is another factor behind choosing launches over roadways for the passengers. Between 2008 and 2014, a comparative study of 18,771 accidents revealed that waterways accounted for only 1% of the total incidents, while railways accounted for 12% and roads took the lead with 87% of the accidents (Probha & Hoque, 2018). Despite such importance and popularity while enjoying a geographic advantage, there are several issues with service quality regarding this mode of transportation. Due to a lack of research and a predominantly captive passenger base, the necessary steps to solve service quality issues were overlooked. A study was carried out to assess how satisfied passengers are with various forms of public transportation (Agarwal, 2008). However, research on the variables affecting passenger satisfaction in inland waterway transportation specially from a developing country's perspective is still scarce. Therefore, this study examines the effects of factors influencing passenger satisfaction regarding inland-waterway transportation e.g., launch, particularly on the Dhaka-Barishal river route. The findings will assist launch owners and policymakers understand how to improve passenger experience and enhance the quality of service provided by the launch vessels.

2 Literature Review

This literature review encompasses an extensive exploration, categorizing various facets related to factors influencing launch service quality. The focus will be on finding the effect of socioeconomic and demographic characteristics and travel experience and their relationship with service quality. Each aspect is elaborated below based on the SERVQUAL and SERVPERF models.

SERVQUAL is a comprehensive research model created to measure service quality by capturing consumer perceptions and expectations across five dimensions: Tangibles, empathy, assurance, responsiveness and reliability (Parasuraman et al., 1988). The following factors fall under SERVQUAL model:

Punctuality falls under the dimension of reliability. Passengers prioritize punctual arrival at their destination. Surveys conducted in Stockholm and Brisbane among the general public revealed that on-time boat performance was the most satisfying factor, alongside comfort (Translink, 2016). Schedule timetables, accessibility, and announcement systems directly correlate with passenger satisfaction (Ghosh et al., 2017).

Insufficient safety regulations and materials, such as personal protective equipment, life jackets, and safety harnesses, contribute to frequent marine accidents, lowering the service quality of water vessels (Lau et al., 2020). Limited availability, faulty equipment, and untrained crew members pose safety risks and degrade the service quality ("How to Take Care of Personal Safety on Ships?," 2018). Safety is under the dimension of tangibility.

In a study, staff attitude and behavior were ranked highest in terms of relative relevance under responsiveness, assurance, and empathy dimensions. This indicates that the behavior of staff members, including politeness, friendliness, productivity, and skill levels, can significantly impact customer satisfaction levels (Hasan & Karmaker, 2019). Another survey in Lucknow City, India, shows that well behavior from drivers and the staff increases passenger satisfaction (Singh, 2016).

The SERVPERF model, developed by Cronin and Taylor in 1994, is a customer-oriented approach that evaluates service quality based on actual outcomes and performance. It emphasizes productivity, quality, and flexibility as key aspects (Boljwin and Kumpe, 1990). The following factors satisfy the SERVERF model:

Comfort plays a vital role in enhancing service quality. In a Cape Coast, Ghana taxi service study, comfort, including factors like comfortable seats, well-maintained vehicles, and proper air circulation, showed the strongest correlation (Horsu & Yeboah, 2015). Similarly, a survey of passengers using the launch service from Dhaka to Barisal highlighted the significance of comfort and hygiene in customer satisfaction (Hasan & Karmaker, 2019).

Passenger harassment significantly impacts service quality. A recent study interviewed 2,500 women across all districts of Bangladesh, revealing that 90% of women and girls have encountered sexual harassment while using public transportation. This unpleasant experience often leads them to avoid such services (Ferdous & Dipu, 2019).

In a survey of boat users in Stockholm, cleanliness and punctuality were rated as highly important (Tanko et al., 2019). Similarly, a study by Singh (2016) found that passenger satisfaction is strongly influenced by a clean environment inside the vehicle, which is often prioritized over factors like cost, service frequency etc.

As observed, water transport service quality research has been conducted mostly in developed countries' context. In contrast to other transportation modes, water transport, especially in Bangladesh, has been largely neglected in scholarly investigations. Closing this research gap is crucial to improving water transport services in the region.

3 Data Collection & Methodology

Focusing on prior literature, a pilot study, and the local context, a questionnaire survey was developed which was conducted at the Dhaka and Barishal launch terminals. Respondents, who actively boarded the launches, participated in face-to-face interviews, the final dataset contained 260 responses. To ensure a comprehensive representation of passengers from various destinations, the locations were visited on different days and hours.

The survey consisted of three sections. The first and the second part comprised questions based on the 'Socio-economic & travel characteristics' and 'Travel experience' of the respondents which formed our independent variables. The final section of the survey evaluated the 'Satisfaction level on service quality' of the passengers based on 30 items on a five-point Likert scale, with responses ranging from "strongly agree" to "strongly disagree." This section was divided into six categories- Comfort (6 items, e.g., "I think that the seat/deck is not comfortable), Punctuality (4 items, e.g., ". I think that the waiting time for the launch is long"), Cleanliness (4 items, e.g., "I

often feel that the floors are dirty and slippery”), Safety (5 items, e.g., “I think there aren’t enough life jackets or floaters”), Staff characteristics (5 items, e.g., “I think that most of the staff is untrained or inexperienced”), and Harassment (5 items, e.g., “I often feel harassed by the staff or other passengers”). These six categories are now the respective response variable for each of the six service quality models. Since our dependent variables of interest are count variables, we utilized the Negative Binomial and Poisson models to ascertain the significance of the explanatory variables on service quality. Model equation for Poisson is:

$$\Pr(n_{it} | \mu_{it}) = \frac{\exp(-\mu_{it}) \mu_{it}^{n_{it}}}{n_{it}!} \tag{1}$$

Where, $\Pr(n_{it})$ is the probability of the outcome of perceived service quality by passenger i in a given time t ; μ_{it} is the expected outcome of perceived service quality by individual passenger i in a given time t . And the equation for Negative Binomial model is:

$$\Pr(n_{it} | \mu_{it}, k) = \frac{\binom{n_{it} + 1/k}{1/k} \left(\frac{k\mu_{it}}{1+k\mu_{it}}\right)^{n_{it}} \left(\frac{1}{1+k\mu_{it}}\right)^{1/k}}{(1/k)n_{it}!} \tag{2}$$

The parameter "k," where k is greater than 0, is often called the over dispersion parameter. The Negative Binomial model reduces to the Poisson model when k approaches zero. The Poisson regression model is part of the Negative Binomial model, and a t-test with k = 0 can be used to determine the presence of significant over-dispersion in the data. The statistical analysis was carried out using STATA 15 software.

4 Results & Discussion

Table 1 shows the Negative Binomial estimates of statistically significant variables at the 90% confidence level for the six service quality models. A negative z-value demonstrates a negative relationship between perceived service quality and the explanatory variable, whereas a positive value indicates a positive relationship.

Table 1. Estimated Negative Binomial Model in terms Service Quality

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
	Comfort	Safety Facilities	Staff Characteristics	Punctuality	Harassment	Cleanliness
First Value = z value, Second Value = [p value]						
Socioeconomic & Travel Characteristics						
Gender	5.98 [0.000]	-	2.7 [0.007]	2.54 [0.011]	9.38 [0.000]	-
Marital Status	-	-	-3.06 [0.002]	-	-	-
Own Vehicle	-3.29 [0.001]	-	-	2.73 [0.006]	-	-
Age						
<20	-	-	-	7.5 [0.000]	-	-
20-40	1.78 [0.076]	-	-	7.5 [0.000]	-	-
40-60	-	-	-	3.39 [0.001]	-	-
Education						
Uneducated	-	2.84 [0.005]	2.13 [0.033]	-	-	4.77 [0.000]
Primary	-	-	5.36 [0.000]	-	-	10.39 [0.000]
SSC	-	-	4.60 [0.000]	-	-	8.92 [0.000]
HSC	-	-	5.3 [0.000]	-	-	7.90 [0.000]
Graduate	-2.62 [0.009]	-	-	-	-	-
Monthly Income						
< 15,000	-	-	3.06 [0.002]	-	-	-2.18 [0.029]
15,000 -25,000	3.7 [0.000]	1.91 [0.056]	-	-	-	-
>40,000	-	-	-	-2.76 [0.006]	-	-
Profession						
Businessman	-	-	-	-	-1.61 [0.107]	-
Student	-	-	-	1.87 [0.062]	-	-
Mode to Reach Launch Station						
Bus	-	-	-	-	2 [0.045]	-

CNG	-	2.49 [0.013]	-	-1.75 [0.080]	-	-
Rickshaw	-	-	1.71 [0.088]	-	-	-
Home Location						
Barishal						-2.11 [0.035]
Borguna	-	1.67 [0.096]	-	-2.86 [0.004]	-	-
Purpose of Travel						
Home Visit	-	-	-	2.19 [0.028]	-	-
Recreation	-1.61 [0.108]	-	-	-	-1.62 [0.105]	-
Job Purposes	-	-	-	1.95 [0.051]	-	-
No of Family Members						
1 to 3	-1.96 [0.050]	2.94 [0.003]	-	-	-	-
More than 6	-	4.48 [0.000]	-	-	-	-
Frequency of Water Transport Use						
Every 3 Months	-	-	-2.12 [0.034]	-	-	-1.83 [0.067]
Yearly	-	-3.94 [0.000]	-	-	1.9 [0.058]	-
Travel Experience Based Questions						
Accident	-	-2.56 [0.010]	-1.82 [0.068]	-	-	-
Break Down	2.22 [0.026]	-2.27 [0.023]	-	-	-	-
Motion Sickness	-	-	-	-	-2.06 [0.039]	-
Ticket System	-	-	-	-	3.49 [0.000]	-
Price of Services	-1.68 [0.094]	1.94 [0.052]	-	-	-1.96 [0.050]	-
Travel Time	2.9 [0.004]	-1.84 [0.066]	-	2.18 [0.029]	-	-1.81 [0.070]
Women Seats		-2.80 [0.005]	-	3.27 [0.001]	-	-
Overall Service of Launch						
Very Poor	-2.16 [0.031]	-	-	3.79 [0.000]	-	-
Main Problem of Water Vessel						
Not maintain time table	-	-	-	-1.88 [0.060]	-	-
Reasoning for Choosing Water Transportation						
Comfort	4.20 [0.000]	-	-	-	-	-
Avoid Traffic	-	-	-	-	-1.65 [0.101]	-
Others	-	2 [0.045]	-	-	-1.95 [0.051]	-
No. of obs. (n)	260	260	260	260	260	260
Log-likelihood	-750.734	-705.829	-659.784	-766.884	-685.252	-617.634
LR Chi-square	87.51	84.71	83.70	155.97	128.98	142.36
Prob >Chi-square	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Pseudo R-square	0.0551	0.0566	0.0596	0.0923	0.086	0.1033

Though analysis did not find any factor that affected the service quality related satisfaction level across all six aspects simultaneously, but factors such as gender, minimum education level, perception regarding tickets and service pricings and travel time influenced the satisfaction level across most of the aspects together. Analysis reveals that male respondents are associated with higher satisfaction levels of service quality across comfort, staff characteristics, punctuality, and harassment. The strongest effect is observed in relation to harassment (z-score=9.38), indicating a substantial difference in male and female satisfaction levels regarding harassment. It may be because males are typically more tolerant of challenging environments and experience far fewer instances of harassment than females. Juwaheer (2011), Snipes et al.(2006) and a few other studies also indicate that males usually rate service quality higher than females. Owning a private vehicle is seen to have opposite effects on the satisfaction level of comfort and punctuality among the launch passengers. Passengers who own a private vehicle are less satisfied with the comfort of launches and more satisfied with the punctuality. This may be since owners of private vehicles are accustomed to a more comfortable mode of transportation, and they may also have a greater appreciation for the launch staff's punctuality efforts because they understand the struggles associated with maintaining punctuality. The analysis also shows that respondents from each age group have significant positive relationships with satisfaction levels regarding punctuality, although the age group 40 to 60 has a relatively weaker relationship than those under 20 and 20 to 40. One of the reasons for such high levels of satisfaction with punctuality across all age groups may be that the launches on these routes strictly adhere to their schedules. Additionally, as people age, they become more cognizant of efficient time management and consequently more skeptical of punctuality initiatives. Positive z-values for satisfaction level regarding staff characteristics and cleanliness across the four education group categories indicate that respondents have a favorable perception of these service qualities; however, the effect is less pronounced for respondents with no formal education. Educated

passengers may better comprehend their rights during the journey and possess better communication skills, allowing them to communicate their needs or cleanliness concerns to the crew effectively. On the other hand, graduates tend to be the most aware and sensitive to service shortcomings on a voyage, resulting in reduced service quality satisfaction (z-score = -2,62). Respondents with low income (<15000 BDT) report higher satisfaction levels regarding staff characteristics and lower satisfaction levels regarding cleanliness. Low-income people are usually captive riders with only one option, so they appreciate whatever service the launch staff offer. In addition, they typically purchase tickets for the lowest class, where the seating arrangements are typically poor and unclean. A z-score of -2.76 suggests that passengers with relatively higher income (>40000 BDT) have poor perception regarding punctuality because they are typically exposed to more efficient and punctual travel alternatives. This is supported by a study by Devasena (2014) that states that there is a significant relationship between the monthly income and opinion on satisfaction level of services. Due to the dread of theft and dacoity at the launch terminals, businessmen tend to have a lower satisfaction level regarding harassment as seen from the model analyses. Passengers' mode of transportation and their home locations are also found to significantly affect their degree of satisfaction with service quality. People who normally use CNG-autorickshaws to get to the terminals are more satisfied with the launch's safety facilities but less satisfied with its punctuality. This could be because, autorickshaws assist passengers in reaching terminals on time increasing their expectations regarding punctuality, but being a less safe means of transportation than launch makes passengers appreciate the launch's safety facilities.

People who travel for recreation report lower levels of service quality satisfaction than those who travel for other purposes. They may have a greater expectation of comfort and a harassment-free travel experience than others, and if their expectations are not met, they may express lower levels of satisfaction. Regardless of the size of their families, respondents report high levels of satisfaction about launch safety facilities. Frequent travelers report lower levels of satisfaction with staff characteristics and cleanliness, which may be due to their exposure to a broader variety of service standards, which has led to an increase in their expectations. It has been observed that respondents who have previously experienced accidents or engine breakdowns during their launch journeys report low levels of satisfaction with the safety facilities. The psychological impact of their prior traumatic experience causes them to evaluate safety measures with greater caution and skepticism. This falls in line with the findings of Albarracín and Wyer (2000). Those who are pleased with the ticket and service costs are also pleased with the safety facilities. When individuals positively perceive the value of the tickets they purchased, they may have a positive impression of their travel experience as a whole, which extends to other aspects of travel such as safety facilities. Passengers whose travel time is minimized by launch also have a negative impression of the safety facilities but possess positive satisfaction levels regarding comfort and punctuality. Respondents who think the overall service of launch to be very poor also report very low satisfaction levels for comfort but still hold a positive perception of the punctuality of the service. Passengers understand that external factors largely contribute to staff's inability to strictly adhere to schedules, resulting in them not holding the providers accountable. People who view punctuality issues as the most significant problem with such water vessels, however, report low levels of punctuality-based service quality satisfaction. Similarly, those who select the mode for comfort are satisfied with the comfort-based service quality.

The Negative Binomial and Poisson model for cleanliness shows an improvement in log-likelihood than the other five models. Since variables are same for all the models, the cleanliness model better fits its dataset. The p-value (<0.001) from the likelihood ratio test indicates that all six models significantly surpass the fit of the null model.

5 Conclusion

The current study aims to examine the influence of socioeconomic status, travel characteristics, and travel experiences on passengers' satisfaction with the service quality of water vessels in terms of Comfort, Safety Facilities, Staff Characteristics, Punctuality, Harassment, and Cleanliness. Negative Binomial models were used to analyze information collected from 260 passengers at Dhaka and Barishal launch terminals. Gender, minimum education level, perception of ticket and service pricing, and travel time influenced the level of satisfaction across most aspects concurrently. Therefore, service providers can consider these factors to enhance the passengers' perception of the overall service quality. The results affirmed that male passengers are generally more tolerant and satisfied than female passengers, particularly regarding harassment. Passengers who own private vehicles are dissatisfied with the comfort level on these vessels but appreciative of their punctuality. Positive satisfaction ratings from respondents of all ages indicate that the water vessels adhere to their schedules and are prompt in arrival and departure. Education levels of the passengers were seen to have a significant effect on their understanding of their rights regarding the service quality on the vessels. Being captive riders also influences passengers' perception regarding service quality and they generally become acclimated to whatever service the mode provides, regardless of its quality. Recreational travelers have higher expectations for comfort and a harassment-free journey, and those who have previously been involved in accidents on such water vessels are more

skeptical of the safety features. This study's findings will help authorities and service providers develop policy implications for enhancing the overall service quality-related satisfaction of passengers and may form the basis for future efforts to encourage people to choose this mode of transportation as a safe and comfortable travel option.

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